SECTION 1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

1.1 Product Identifier
- **Trade Name**: Sandvik 35WF Welding Flux
- **Classification**: ISO 14174: S A AF 2
- **Product Type**: Submerged Arc Wire Welding Flux
- **Product Identifiers**: 35WF
- **SDS Date**: April 2016

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against
- **Product Use**: Welding Flux
- **Uses Advised Against**: Use only as indicated for welding operations

1.3 Details of the Supplier of the Substance or Mixture
- **Manufacturer**: Sandvik Wire and Heating
  - P.O. Box 1220
  - Scranton, PA 18501-1220
  - +1 (570) 585-7500
  - wire-welding_products.smt@sandvik.com
- **Telephone**: +46 26 260000
- **Email**: wire-welding_products.smt@sandvik.com

1.4 Emergency Telephone Number
- **Emergency Spill Information**
  - +1 (570) 585-7500 (United States)
  - +46 26 260000 (Sweden)
- **Other Product Information**: www.smt.sandvik.com

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the Substance or Mixture

**CLP/GHS Classification (1272/2008):**
This product does not meet the criteria for classification according to Regulation (EC) 1272/2000 (CLP)

2.2 Label Elements
This product does not meet the criteria for classification according to Regulation (EC) 1272/2000 (CLP)

2.3 Other Hazards: None

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.2 Mixtures

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No. / EINECS No. / REACH Reg. No.</th>
<th>% (w/w)</th>
<th>CLP/GHS Classification (1272/2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Fluoride (CaF₂)</td>
<td>7789-75-5 / 232-188-7</td>
<td>50-60</td>
<td>Not hazardous</td>
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<tr>
<td>Alumina (Al₂O₃)</td>
<td>1344-28-1 / 215-619-6</td>
<td>40-50</td>
<td>Not Hazardous</td>
</tr>
<tr>
<td>Potassium Silicate (KSiO₂)</td>
<td>1312-76-1 / 215-199-1</td>
<td>2-5</td>
<td>Met. Corr. 1 (H290), Skin Corr. 1B (H314), Eye Dam 1 (H318)</td>
</tr>
</tbody>
</table>
SECTION 4: FIRST AID MEASURES

4.1 Description of First Aid Measures

First Aid:

Eye contact: If eye irritation occurs, flush eyes immediately with water while holding open eyelids. Get medical attention if irritation persists.

Skin contact: Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops and persists. Get immediate medical attention for treatment of burns.

Inhalation: Remove victim to fresh air. Give artificial respiration if needed. If breathing is difficult, oxygen should be administered by qualified personnel. Get medical attention.

Ingestion: If swallowed, do not induce vomiting. Rinse mouth with water. Do not give any by mouth to an unconscious person. Get medical attention.

See Section 11 for more detailed information on health effects.

4.2 Most Important symptoms and effects, both acute and delayed: Dust may cause mechanical eye and skin irritation. Inhalation of welding fumes may cause dizziness, nausea, or dryness or irritation of nose, throat, or eyes. Arc rays may injure eyes and burn skin. Prolonged or repeated exposure to welding fumes causes damage to respiratory system and lungs.

4.3 Indication of any immediate medical attention and special treatment needed: If eye or skin burns occur, get immediate medical attention.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing Media: Use media appropriate for the surrounding fire.

5.2 Special Hazards Arising from the Substance or Mixture

Unusual Fire and Explosion Hazards: Welding arc and sparks can ignite combustibles and flammables. Refer to American National Z49.1 for fire prevention during the use of welding and allied procedures.

Combustion Products: Typical combustion products include fluorides and oxides of carbon, nitrogen, calcium, sodium, aluminum and silicon.

5.3 Advice for Fire-Fighters: Self-contained breathing apparatus and protective clothing should be worn in fighting fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan.
SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment and Emergency Procedures:
Wear personal protective equipment as described in See Section 8. Wash hands thoroughly after handling.

6.2 Environmental Precautions:
Avoid release into the environment. Report spill as required by local and national regulations.

6.3 Methods and Material for Containment and Cleaning Up:
Vacuum up or sweep up. Place into a container for disposal or reuse.

6.4 Reference to Other Sections:
Refer to Section 8 for personal protective equipment and Section 13 for disposal information.

SECTION 7: HANDLING and STORAGE

7.1 Precautions for Safe Handling:
Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Avoid breathing welding fumes. Keep your head out of the fumes. Use with enough ventilation or exhaust at the arc, or both, to keep fumes and gases below the occupational exposure limits in your breathing zone and the general area. Use air sampling to determine the need for corrective action. (Refer to Section 10 for additional information).

Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Fumes from welding and oxygen depletion can alter the air quality causing injury or death.

Take appropriate precautions to prevent fires and explosion.

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, Safety in Welding and Cutting, published by the American Welding Society, P.O. Box 351040, Miami, FL 33135; and OSHA Publication 2206 (29CFR 1910), U.S. Government Printing Office, Washington, DC 20402, for more information. In Germany, see BGV D1 'Provisions for Safety and Health at work'. In the United Kingdom, see WMA Publication 236 and 237, “Hazards from Welding fume”. In Canada, see CSA Standard CAN/CSA-W117.2-01 “Safety in Welding, Cutting and Allied Processes”.

Before use, read instruction manual. Electric shock can kill. Arc rays can injure eyes and burn skin. Fumes and gases can be hazardous to your health. Sparks and splatter can cause fire or explosion.

Use ventilating fan to remove fumes. Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves. Arc rays can burn eyes and injure skin.

7.2 Conditions for Safe Storage, Including any Incompatibilities:
Store in a dry area to protect product quality.
7.3 Specific end use(s):
Industrial uses: Welding flux
Professional uses: Welding flux

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters: Refer to country specific regulations for exposure limits not provided below.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>US ACGIH</th>
<th>German OEL</th>
<th>Brazil OEL</th>
</tr>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alumina (Al2O3)</td>
<td>1 mg/m³ TWA (respirable fraction)</td>
<td>1.5 mg/m³ TWA (respirable fraction)</td>
<td>None Established</td>
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<tr>
<td></td>
<td></td>
<td>4 mg/m³ TWA (inhalable dust)</td>
<td></td>
</tr>
<tr>
<td>Calcium Fluoride (CaF₂) (as F)</td>
<td>2.5 mg/m³ TWA</td>
<td>1 mg/m³ TWA (inhalable fraction)</td>
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<tr>
<td></td>
<td></td>
<td>4 mg/m³ STEL (inhalable fraction)</td>
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</tr>
<tr>
<td>Potassium Silicate</td>
<td>None Established</td>
<td>4 mg/m³ TWA (inhalable dust)</td>
<td>None Established</td>
</tr>
<tr>
<td>Sodium Silicate</td>
<td>None Established</td>
<td>4 mg/m³ TWA (inhalable dust)</td>
<td>None Established</td>
</tr>
<tr>
<td>Silica (SiO₂) (quartz)</td>
<td>0.025 mg/m³ TWA (respirable)</td>
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<td>None Established</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
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</tr>
<tr>
<td>Alumina (Al2O3)</td>
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<td>4 mg/m³ TWA (respirable fraction)</td>
<td>10 mg/m³ TWA (respirable fraction)</td>
<td>2 mg/m³ LLV (respirable fraction)</td>
</tr>
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<td></td>
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<td></td>
<td>5 mg/m³ LLV (inhalable)</td>
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<tr>
<td>Calcium Fluoride (CaF₂) (as F)</td>
<td>2.5 mg/m³ TWA</td>
<td>2.5 mg/m³ TWA</td>
<td>2.5 mg/m³ TWA</td>
<td>2 mg/m³ LLV</td>
</tr>
<tr>
<td>Potassium Silicate</td>
<td>None Established</td>
<td>4 mg/m³ TWA (respirable fraction)</td>
<td>10 mg/m³ TWA (inhalable fraction)</td>
<td>54 mg/m³ LLV (respirable fraction)</td>
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<td>10 mg/m³ TWA (total dust)</td>
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<td>10 mg/m³ LLV (inhalable fraction)</td>
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<tr>
<td>Sodium Silicate</td>
<td>None Established</td>
<td>4 mg/m³ TWA (respirable fraction)</td>
<td>10 mg/m³ TWA (inhalable fraction)</td>
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<tr>
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<td>10 mg/m³ TWA (total dust)</td>
<td></td>
<td>10 mg/m³ LLV (inhalable fraction)</td>
</tr>
<tr>
<td>Silica (SiO₂) (quartz)</td>
<td>None Established</td>
<td>0.1 mg/m³ TWA (respirable fraction)</td>
<td>0.1 mg/m³ TWA (respirable fraction)</td>
<td>0.1 mg/m³ LLV (respirable dust)</td>
</tr>
</tbody>
</table>

Definitions
OEL – Occupation Exposure Limit - An occupational exposure limit is an upper limit on the acceptable concentration of a hazardous substance in the workplace. It is typically set by national authorities and enforced by legislation to protect occupational safety and health.

IOELV - Indicative Occupational Exposure Limit Values – An exposure limit established by the European Union under Article 3 of the Chemical Agents Directive (98/24/EC). Member states are required to consider IOELVs when establishing national occupational exposure limits.

STEL - Short Term Exposure Limit - A 15-minute time weighted average exposure which should not be exceeded at any time during a work day.

TLV - Threshold Limit Value – American Conference of Governmental Industrial Hygienists – Time weighted average (TWA) concentration for a normal 8-hour work day and a 40-hour work week to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

8.2 Exposure Controls:
Recommended Monitoring Procedures: Particulates are collected on filters and analyzed by AA or ICP. Refer to professional industrial or occupational hygienist for sampling and analytical methods. Certain regulations require periodic monitoring.
**Appropriate Engineering Controls:** Use enough general ventilation, local exhaust at the arc, or both, to keep the fumes and gases below occupational exposure limits in the workers’ breathing zone and the general area. Train each welder to keep his/her head out of the fumes. Refer to ANSI Z49.1 and other applicable regulations for additional information.

**Personal Protective Measures**

**Eye/face Protection:** Safety glasses should be worn when submerged arc welding. For submerged arc welding care must be taken to maintain flux burden over the weld pool to prevent arc flashing. For Electroslag welding, there is no flux burden over the molten weld pool, therefore it is recommended to use a lens filter as dark as possible without obstructing the view of the weld pool.

**Skin Protection:** Impervious clothing is recommended to avoid skin contact.

**Hands:** Welders gloves required to protect hands and arms from radiation, sparks, and electric shock.

**Respiratory Protection:** Use a respirable fume respirator or air-supplied respirator when welding in confined area, or where local exhaust or ventilation does not keep exposure below occupational exposure limits. Respirator selection and use should be based on contaminant type, form and concentration. Follow applicable regulations and good Industrial Hygiene practice.

**Other protection:** Wear head, hand, and body protection to help prevent injury from radiation, sparks, and electric shock. At a minimum, this includes welder’s gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, and dark substantial clothing. Train each welder not to touch live electrical parts, and to insulate his/her person from work and ground.

**SECTION 9: PHYSICAL and CHEMICAL PROPERTIES**

9.1 Information on basic Physical and Chemical Properties

- **Appearance:** Agglomerated Flux.
- **Odor:** Odorless
- **Odor Threshold:** Not applicable
- **Melting/Freezing Point:** >1000°C (>1800°F)
- **Flash Point:** Not flammable
- **Lower Flammability Limit:** Not applicable
- **Upper Flammability Limit:** Not applicable
- **Vapor Density (Air=1):** Not applicable
- **Solubility:** Insoluble in water
- **Autoignition Temperature:** Not applicable
- **Viscosity:** Not applicable
- **Oxidizing Properties:** Not applicable
- **Molecular Formula:** Mixture
- **pH:** Not applicable
- **Boiling Point:** Not applicable
- **Evaporation Rate:** Not applicable
- **Vapor Pressure:** Not applicable
- **Relative Density:** Not available
- **Octanol/Water Partition Coefficient:** Not applicable
- **Decomposition Temperature:** Not applicable
- **Explosive Properties:** None
- **Specific Gravity (H₂O= 1):** Not available
- **Molecular Weight:** Mixture

9.2 Other Information: None

**SECTION 10: STABILITY and REACTIVITY**

10.1 Reactivity: Not reactive under normal conditions.

10.2 Chemical Stability: Stable.

10.3 Possibility of Hazardous Reactions: None known.
10.4 Conditions to Avoid: None known.

10.5 Incompatible Materials: Contact with acids or bases may cause generation of gas. Welding arc and sparks can ignite combustibles and flammables. Refer to American National Z49.1 for fire prevention during the use of welding and allied procedures.

10.6 Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, and the process, procedures, and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, galvanizing, or phosphate coatings on steels which would produce phosphine gas), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder’s head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities which may be decomposed by the arc into toxic gases such as phosgene).

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form than ingredients in the manufactured product. Typical decomposition is also listed in Section 3. Decomposition products of normal operation include those originating from the volatilization reaction, or oxidation of the materials shown in Section 3, plus those from the base metal and coating, etc., as noted above.

One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder’s helmet, if worn, or in the worker’s breathing zone. See ANSI/AWS F1.1, available from the American Welding Society, P.O. Box 351040, Miami, FL 33135.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects:

Potential Health Effects: Welding consumables are not hazardous until welded. When this product is used for welding, hazardous fumes and gases may be created. Other factors to consider include the base metal and the base metal coatings (such as paint, plating, galvanizing, or phosphate coatings).

Electric arc welding may create one or more of the following health hazards:

Eye Contact: Arc rays (ultraviolet light) can cause eye injury.

Skin contact: Arc rays may cause skin burns. Electric shock can kill. Skin contact with metal powder residue may cause irritation.

Inhalation: Inhalation of dust may cause irritation. Inhalation of gas and fumes may be hazardous. Over exposure to welding fumes may result in discomfort, such as dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

Ingestion: Swallowing may cause gastrointestinal disturbances.

Chronic Toxicity: Prolonged or repeated exposure to welding fumes causes damage to respiratory system.

Acute toxicity: No acute toxicity data available for the product. Product oral acute toxicity estimate (ATE) is >2000 mg/kg

Ingredient Toxicity Values
Alumina: Oral rat LD50 > 10000 mg/kg, Inhalation rat LC50 7.6 mg/L/1 hr
Calcium Fluoride: Oral rat LD50 > 2000 mg/kg; Inhalation rat LC50 > 5070 mg/m³/4 hr
Potassium Silicate: Oral rat LD50 >5000 mg/kg; Inhalation rat LC50 > 2.06 mg/L/4 hr; Dermal rat LD50 >5000 mg/kg.
Silica, quartz: No toxicity data available
Sodium Silicate: Oral rat LD50 3400 mg/kg; Inhalation rat LC50 > 2.06 mg/L/4 hr (structurally similar chemical); Dermal rat LD50 >5000 mg/kg (structurally similar chemical)

**Skin corrosion/irritation:** Potassium silicate and sodium silicate are irritating at the levels present in the product based on studies with laboratory animals.

**Eye damage/irritation:** Potassium silicate and sodium silicate are irritating at the levels present in the product based on studies with laboratory animals.

**Respiratory Irritation:** No data available. Potassium silicate and sodium silicate may cause respiratory irritation.

**Respiratory Sensitization:** None of the components are known to cause respiratory sensitization.

**Skin Sensitization:** None of the components have been shown to cause skin sensitization in animals or humans.

**Germ Cell Mutagenicity:** None of the components are germ cell mutagens.

**Carcinogenicity:** None of the components are classified as a carcinogen by the EU CLP. Crystalline is classified by IARC as a “Known Human Carcinogen” (Group 1A).

**Reproductive Toxicity:** None of the components have been shown to cause reproductive or developmental toxicity.

**Specific Target Organ Toxicity:**

- **Single Exposure:** No data available.
- **Repeat Exposure:** Excessive inhalation of respirable crystalline silica dust may cause may cause a progressive, disabling and sometimes fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function.

**Aspiration Toxicity:** This product does not meet the criteria for aspiration toxicity.

### SECTION 12: ECOLOGICAL INFORMATION

12.1 **Toxicity:** No toxicity data available for the product.

**Ingredient Aquatic Toxicity Values**

- **Alumina:** No data available.
- **Calcium Fluoride:** No toxicity data available
- **Potassium Silicate:** 48 hr LC50 Leuciscus idus > 146 mg/L; 24 hr EC50 daphnia magna > 146 mg/L
- **Sodium Silicate:** 96 hr LC50 Danio rerio 1108 mg/L; 48 hr LC50 daphnia magna 1700 mg/L; 72 hr EC50 desmodesmus subspicatus 207 mg/L

12.2 **Persistence and degradability:** Biodegradation is not applicable to inorganic substances.

12.3 **Bioaccumulative Potential:** No data available.

12.4 **Mobility in Soil:** No data available.

12.5 **Results of PVT and vPvB assessment:** Not required.

2.6 **Other Adverse Effects:** No data available.
SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods:
Dispose in accordance with local and national regulations. Prevent waste from contaminating the surrounding environment. Discard any product, residue, disposable container, or liner in an environmentally accepted manner, in full compliance with federal, state, and local regulations.

SECTION 14: TRANSPORTATION INFORMATION

<table>
<thead>
<tr>
<th>14.1 UN Number</th>
<th>14.2 UN Proper Shipping Name</th>
<th>14.3 Hazard Class(s)</th>
<th>14.4 Packing Group</th>
<th>14.5 Environmental Hazards</th>
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</thead>
<tbody>
<tr>
<td>US DOT</td>
<td>Not Regulated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canadian TDG</td>
<td>Not Regulated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU ADR/RID</td>
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<tr>
<td>IMDG</td>
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<td></td>
</tr>
<tr>
<td>IATA/ICAO</td>
<td>Not Regulated</td>
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</tr>
</tbody>
</table>

14.6 Special Precautions for User: None

14.7 Transport in Bulk According to Annex III MARPOL 73/78 and the IBC Code: Not applicable – product is transported only in packaged form.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

EU Regulations:

EU RoHS: Finished welds using Sandvik welding consumables are RoHS compliant. Sandvik Stainless Steel Welding Products contain Chromium. When welded Sandvik Stainless Steel Welding Products will produce Cr VI (hexavalent chrome), however, the weld deposit does not contain Cr VI as it will all be in the zero valent state or as Cr III as an oxide. Finished products manufactured using Sandvik Stainless Steel Welding Products will not contain Cr VI.

EU SVHC: These products do not contain substances identified as Substances of Very High Concern when sold.

International Chemical Inventories

US EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory or exempt.

Australia: All of the components in this product are listed on the Australian Inventory of Chemical Substances (AICS) or exempt.

Canadian Environmental Protection Act: All of the components in this product are listed on the Domestic Substances List (DSL) or exempt.

China: All of the components in this product are listed on the Inventory of Existing Chemical Substances in China (IECSC) or exempt.

European Union: All the components in this product are listed on the EINECS inventory or exempt.
Japan: All of the components in this product are listed on the Japanese Existing and New Chemical Substances (ENCS) inventory or exempt.

Korea: All of the components in this product are listed on the Korean Existing Chemicals List (KECL) or exempt.

New Zealand: All of the components in this product are listed on the New Zealand Inventory of Chemicals (NZIoC) or exempt.

Philippines: All of the components of this product are listed on the Philippines Inventory of Chemicals and Chemical Substances (PICCS) or exempt.

Taiwan: All of the components of this product are listed on the National Existing Chemical Inventory (NECI) in Taiwan or exempt.

SECTION 16: OTHER INFORMATION

SDS Date of Preparation/Revision: April 2016
SDS Revision History: New SDS.

CLP/GHS Classification and H Phrases for Reference (See Section 3)
Met Corr 1 Corrosive to Metals Category 1
Eye Damage Category 1
Skin Corr 1B Skin Corrosion Category 1B
STOT SE 3 Specific Target Organ Toxicity – Single Exposure Category 3
STOT RE 1 Specific Target Organ Toxicity – Repeat Exposure Category 1

H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
H372 Causes damage to organs through prolonged or repeated exposure.

DISCLAIMER: This product is intended for use only by qualified individuals experienced and trained in welding safety. Conditions of use and suitability of the product for particular uses are beyond our control, and while the information herein is given in good faith, SANDVIK MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nor does Sandvik assume any liability arising out of use of the product described herein. In no event shall Sandvik be liable for any special, incidental, or consequential damages in connection with this SDS.